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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/838,085	04/18/2001	Lawrence E. Foltzer	05043.P001	9574

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EXAMINER

ARTMAN, THOMAS R

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 11/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/838,085

Applicant(s)

FOLTZER ET AL.

Examiner

Thomas R Artman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7,10-12 and 14-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-7, 10-12 and 14-17 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's election of claims 1-2, 4-7, 10-12 and 14-17 in Paper No. 5 is acknowledged.

Claims 3, 8-9, 13 and 18-21 have been cancelled.

Claim Objections

Claim 14 is objected to for being redundant; it recites the last three lines of its parent claim 12 verbatim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Presby (US 5,920,665).

Presby discloses an optical switch (Fig.1) that has the structure including:

- 1) a first plate (item 40) having a plurality of V-shaped grooves to hold a set of optical fibers,
- 2) a second plate (item 35) having V-shaped grooves to hold secondary optical fibers, and

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3) the second plate is movable with respect to the first plate, such that any one of the secondary optical fibers can be optically coupled to any one of the set of optical fibers.

Though Presby's optical fiber switch depicts an MxN arrangement, Presby discloses that his switch can have a Nx1 arrangement, as well as a MxN, in col.8, lines 55-67. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the specific configuration would be dictated by the specific application. The structure of opposing V-groove optical fiber plates is the key for ease of fiber optic alignment and improved switching reliability.

Claims 2, 4, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Presby and in view of Buchholz (US 5,943,456).

Regarding claim 12, Presby discloses or teaches of the structure as outlined above against claim 1. For examination of the additional limitation of using the switch in conjunction with a line card, please see the next paragraph.

Regarding all four claims, though Presby does not specifically disclose the use of a switch with a line card, Buchholz teaches that switches can be used with line cards, in col.4, lines 23-28, "...as is generally known in the art." Line cards generally interface with devices, such as optical to electrical converters to interface with customers, mux/demux devices, and quality monitors, that are used throughout an optical communication system. All of the inputs and outputs of the line card need to be routed for proper communication with other devices. All of the fibers between the switch and line card correspond to the number of I/O fibers the line card uses in order to communicate with the other devices in the communication system. In this way, communication between the line card and other devices is easier and more flexible since the

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addition of a switch can route data to various devices on the same fiber, as necessary. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a switch in conjunction with a line card to allow for increased flexibility within the communications network.

Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Presby and Buchholz and in view of Way (6,421,153).

Regarding both claims, Way teaches the method of error detection and compensation for signal integrity in col.1, lines 40-50. In a typical WDM system, poor quality signal transfer is compensated by switching the data to another, redundant channel that is performing better. The examiner refers to the channel as “redundant” because not all channels are used simultaneously in a typical WDM transmission system. Though the application specifically refers to switching an optical signal to another bandwidth, one skilled in the art would recognize that one could provide for redundant optical fibers and switch an optical signal from one fiber to another in a fiber optic system as dictated by known quality controllers and criteria. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an optical switch in order to redirect optical signals from one optical fiber to another in order to compensate for faulty signal transmission in an efficient way.

Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Presby, Buchholz and Way and in view of Naraoka (US 6,108,467).

Regarding both claims, Naraoka teaches of switching an Nx1 switch for use in error detection and inspection methods (col.3, lines 51-58, and col.9, line 61 to col.10, line 7). Here, the Nx1 optical switch is used to direct signals to signal integrity monitors, which greatly

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simplifies such inspection circuitry. This implies a use of the switch for aiding signal integrity monitors to perform their functions more efficiently in an optical communication system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Nx1 switch in conjunction with signal integrity monitoring devices for performing inspections.

Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Presby and in view of Coffin (US 5,896,197).

Regarding both claims, Presby does not teach of the specific materials used. Coffin discloses the use and teaches the known combination of glass and graphite as having a favorable coefficient of friction for actuation of a linear mirror element in one arm of an interferometer. In such a tight-tolerance, high-speed optical application, the use of glass on a suitable material (graphite in this case) can have excellent mechanical properties for fast, efficient switching capabilities. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the material selection of a glass substrate, mated with an appropriate material (such as a graphite rod), will allow smooth, fast optical switching. The use of borosilicate glass allows for better heat transient characteristics of the substrate. The use of glass or quartz in general would closely match the thermal expansion coefficient of the (glass) optical fibers that are being fixed to it such that minimal stresses will build in the fiber.

Furthermore, silicon is also known to have favorable coefficients of friction with certain materials, some of which are compatible with integrated circuits (ICs). In fact, the use of silicon would allow precision V-grooves to be formed by the well-known technique of anisotropically etching a (100) silicon substrate. The sides of the grooves follow the (111) planes. In this way,

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the use of silicon would provide a well-known, relatively cheap material that would integrate seamlessly with ICs and IC processing. The switch could be integrated within the same line card or a different line card.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use materials such as glass, particularly borosilicate glass, quartz and silicon for the first and second plates.

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Presby and in view of Monchalin (US 4,426,155).

Regarding both claims, Presby does not specifically disclose or teach of the use of alignment rods or bearing rods. Monchalin discloses the use of a bearing rod matched with a V-groove formed into the surface of a plate (Fig.1). The surfaces are coated with Teflon to lower the friction coefficient. For the high-precision optical application of a movable mirror in an interferometer, the alignment bearing provides reliable linear motion along one axis without deviation from the path. Furthermore, since a V-groove is a proven structure for reliably maintaining an optical fiber in proper alignment, one skilled in the art would consider using the same structure for proper alignment of the device itself, particularly when the substrate is already being manufactured with grooves for the fibers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that using an alignment bearing rod fitted into a V-groove in a plate would reliably maintain proper alignment of the second plate relative to the first plate for fast, reliable optical switching. Also, one skilled the art would recognize the functional equivalents of alignment rods and bearing rods. In fact, as implied above by the use of "alignment bearing

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rod", a bearing rod is also performing the function of an alignment rod. A bearing rod further allows motion along its longitudinal axis, which combines both functions of providing alignment and reliable, linear motion in one, simple design.

Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tucker (US 5,982,972) discloses a housing for a line card and discusses a typical line card's function.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 4:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

November 26, 2002


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